

THE LARVA AND PUPA OF THE CADDISFLY SPECIES,
HELICOPSYCHE PARALIMNELLA HAMILTON
(TRICHOPTERA: HELICOPSYCHIDAE)

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Abstract.—Descriptions and illustrations of the larva and pupa of the caddisfly species, *Helicopsyche paralimnella*, are presented. Although the larva of this species most closely resembles that of *H. borealis*, diagnostic characteristics are noted. This species possesses a case typical of all other North American species. The known distribution of this species is limited to three localities in southwestern North Carolina and northwestern South Carolina.

Key Words: Caddisfly, *Helicopsyche*, Helicopsychidae, North Carolina, South Carolina, Trichoptera

The caddisfly genus *Helicopsyche* is represented by six species in America north of Mexico. These include *Helicopsyche borealis* (Hagen) (widespread and common throughout much of North America), *H. limnella* Ross (Arkansas and Oklahoma), *H. mexicana* Banks (Arizona, California, Texas, and Utah), *H. paralimnella* Hamilton (North and South Carolina), *H. piroa* Ross (Kansas, Louisiana, and Texas), and *H. sinuata* Denning and Blickle (California) (Hamilton and Holzenthal 1984). Although only the immature stages of *H. borealis* have been described and illustrated (Vorhies 1909, Elkins 1936, Ross 1944, and Wiggins 1977), larval characters (i.e. color patterns of the head capsules) have been found that will readily separate three additional species: *H. limnella*, *H. mexicana*, and *H. piroa* (Hamilton and Holzenthal 1984, S. W. Hamilton, pers. comm.).

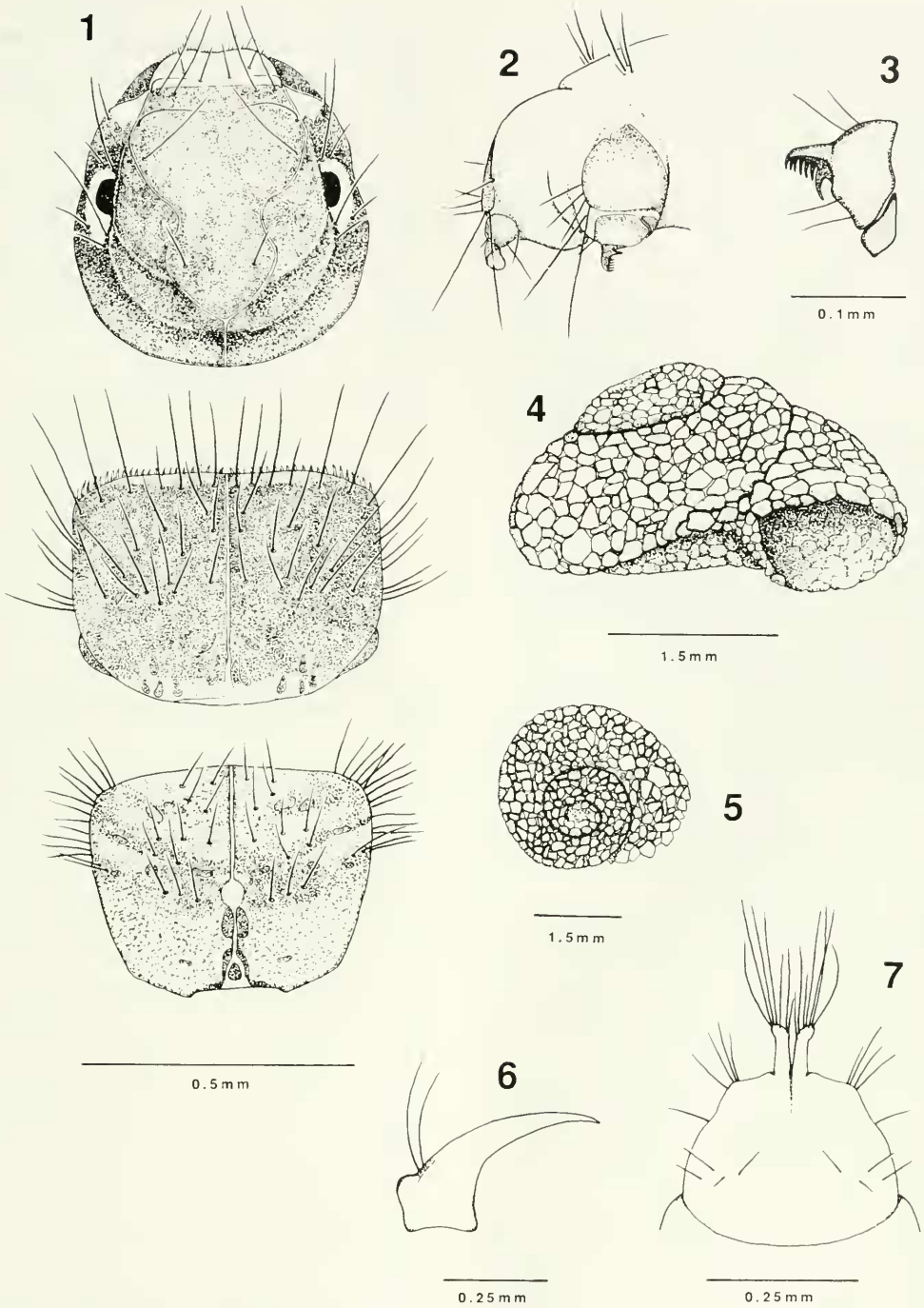
Collections that I made in the Blue Ridge Mountains of North and South Carolina, as well as examination of additional material (Morse et al. 1989) housed in the Clemson University Arthropod Collection (CUAC), have resulted in discovery of the previously unknown larva and pupa of *H. paralimnella*. Association of immatures and adults was made by using metamorphotypes (Milne 1934, Wiggins 1977). Morphological terminology follows that of Wiggins (1977). Representative specimens have been deposited in the Entomology Collection of the Royal Ontario Museum (ROM), the Illinois Natural History Survey (INHS), the U.S. National Museum of Natural History (USNM), and the CUAC.

Helicopsyche paralimnella
Hamilton 1989
(Figs. 1-7)

Helicopsyche paralimnella Hamilton, in
Morse et al. 1989: 30.

Material examined.—NORTH CAROLINA: Jackson/Transylvania County,

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Figs. 1-7. *Helicopsyche paralimnella* larva, larval case, and pupa. 1-3, larva: 1, head, pronotum, and mesonotum, dorsal view; 2, abdominal segment IX, right posterolateral view. 3, anal claw, lateral view. 4, 5, larval case: 4, lateral view; 5, dorsal view. 6, 7, pupa: 6, right mandible, ventral view; 7, abdominal segments VIII and IX with anal rods, dorsal view.

Whitewater River at Route 281, 27 June 1991, M. Floyd, 3 larvae, 2 pupae (ROM); 3 larvae, 2 pupae (INHS); 3 larvae, 2 pupae (USNM); 4 larvae, 1 pupa (CUAC); same locality, 25 Oct. 1989, E. Chen, 1 larva (CUAC); same locality, 7 May 1991, K. Hoffman, 5 larvae (ROM), same locality, 16 March 1989, E. Chen, 3 larvae (INHS), same locality, 7 May 1991, J. Morse, 15 larvae (USNM); M. Floyd, 59 larvae (CUAC); SOUTH CAROLINA: Oconee County, Thompson River at North Carolina border, 18 May 1987, S. Hamilton and K. Hoffman, 2 larvae (CUAC); Pickens County, Wildcat Creek, Clemson University Experimental Forest, 28 August 1986, J. Wilson, 2 larvae (CUAC).

Mature larva.—Figs. 1–3. Length 4–5 mm. Head dark brown except for lightly pigmented labrum, periorcular areas, and portion of genae anterior to antennae (Fig. 1). Pronounced carinae running posteriad from anterolateral corners of frontoclypeal apotome near antennae, mesad to eyes, then forking to posterolateral corners of frontoclypeal apotome and to coronal suture. Anterior half of frontoclypeal apotome twice as wide as posterior half, the apotome lyre-shaped, with sinuous lateral margins. Pronotum dark brown, heavily setose; anterior margin with regular row of about 40 to 50 short, stout spines; few dark muscle scars present on posterior half. Foretrochantin long, with apical seta. Mesonotum brown, with contrasting darker muscle scars and dark, irregular bands running from meson to mesolateral and anterolateral areas; pale, circular area present at midlength of mid-dorsal ecdysial line, just anterior to pair of dark muscle scars. Lateral sclerite of abdominal segment I roughly triangular, with many small spines and one seta along posterior border (similar to Fig. 5.1A, Wiggins 1977). Abdominal segment VIII with row of lateral tubercles (similar to Fig. 5.1E, Wiggins 1977). Abdominal segment IX with pair of dorsomesal tufts, each with five setae (Fig. 2). Lateral sclerite of anal proleg heavi-

ly sclerotized and dark brown, with five to six long, posterior setae. Anal claw comb-like (Fig. 3).

Pupa.—Figs. 6, 7. Length 5 mm. Mandibles long, blade-like, without teeth or serrations (Fig. 6). Anal rods of abdomen narrow, finger-like, with posterior setae nearly twice as long as rods (Fig. 7).

Case.—Figs. 4, 5. Length 5 mm. Snail-shaped, composed of fine sand grains. Dorsal lip of anterior opening extending hood-like over ventral lip.

Discussion: The larva of *H. paralimnella* most closely resembles *H. borealis*. It can be differentiated from *H. borealis* by the lack of muscle scars on the head, the presence of darkly pigmented lateral sclerites on the anal proleg, and its small size (mature larva ≤ 5 mm). These two species have not been found to occur in the same streams. The Ozarkian species, *H. limnella*, the probable sister species of *H. paralimnella* (Morse et al. 1989), is much less darkly pigmented and has large, pale muscle scars on the head. Except for its small size, the pupa of *H. paralimnella* does not seem to differ from those of other North American *Helicopsyche* species. In addition, no distinguishing characters have been found for pupae of *H. borealis*, *H. limnella*, *H. mexicana*, or *H. piroa* (Hamilton and Holzenthal 1984).

At present, *H. paralimnella* is known from only three streams in North and South Carolina. Thompson River (Oconee County, South Carolina) and Whitewater River (Jackson/Transylvania County, North Carolina) are clear, fourth order, mountain streams (439 m altitude), which have moderate to fast current and substrates composed of bedrock, cobble, and smooth boulders. Riparian vegetation is composed primarily of rhododendron and mixed hardwoods. Wildcat Creek is a clear, third order, upper Piedmont stream (240 m altitude) with a sand and cobble substrate. Riparian vegetation consists of mixed hardwoods. Larvae and pupae were found either in bedrock areas among patches of river

weed, *Podostemum* sp., or the underside of cobble and boulders. Morse et al. (1989) reported adult collection dates of 15 June to 21 July.

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